INDIANA DEPARTMENT OF TRANSPORTATION
MATERIALS & TESTS DIVISION

Reinforcing Bar and Dowel Bar Certification Program
ITM No.301-02P

1.0 SCOPE.

1.1 The Indiana Reinforcing Bar and Dowel Bar Certification Program is a voluntary program in which the reinforcing bar and dowel bar manufacturer and the fusion bonded epoxy coater take the responsibility for the compliance of their product in accordance with contract requirements. The Department monitors the manufacturer's and epoxy coater's certifications by random verification sampling and testing.

1.2 The values stated in either English or acceptable SI metric units are to be regarded separately as standard, as appropriate for a specification with which this ITM is used. Within the text, SI metric units are shown in parenthesis. The values stated in each system may not be exact equivalents; therefore each system shall be used independently of the other, without combining values in any way.

1.3 This ITM may involve hazardous materials, operations, and equipment. This ITM does not purport to address all of the safety problems associated with the ITMs use. The ITM user's responsibility is to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2.0 TERMINOLOGY.

2.1 Definitions for terms and abbreviations will be in accordance with the Department’s Standard Specifications, Section 101, and as follows:

2.1.1 Certified Mill Analysis. A document provided by the manufacturer which lists all chemical and physical test results as required by the applicable specifications. The following shall also be included in addition to any other data deemed necessary by the manufacturer:

Manufacturer name and address
Type and Grade for reinforcing bar
Diameter and Grade for dowel bars
Heat Number

2.1.2 Manufacturer. Reinforcing bar or dowel bar rolling mill

2.1.3 Coater. Fusion bonded, epoxy applicator plant

2.1.4 Manufacturer Classification. The manufacturer shall be either Certified or Non-Certified.

2.1.5 Coater Classification. The coater shall be Certified, Level I, Certified, Level II, or Non-Certified.

2.1.6 Certified Manufacturer. A manufacturer that has met the requirements for certification and is allowed to supply reinforcing bar and dowel bars to Department contracts.

2.1.7 Non-Certified Manufacturer. A manufacturer that does not meet certification requirements or has been decertified. Non-certified manufacturers may supply reinforcing bars and dowel bars to Department contracts, but the materials will be jobsite sampled and tested prior to use.

2.1.8 Certified, Level I Coater. An applicator plant of epoxy coating who is certified by CRSI

2.1.9 Certified, Level II Coater. An applicator plant of epoxy coating who is certified by the Department

2.1.10 Non-Certified Coater. An applicator plant of epoxy coating who does not meet certification requirements or has been removed from certification status. Non-certified coaters may supply reinforcing bars and dowel bars to Department contracts, but the materials will be jobsite sampled and tested prior to use.

3.0 CERTIFICATION PROCEDURE FOR MANUFACTURERS.

3.1 General. Certification shall be based on satisfactory compliance of heats tested to standard specifications; satisfactory comparison of test results between the manufacturer's laboratory and the Department's laboratory; and satisfactory compliance to stated conditions for random samples taken from materials arriving at the jobsite. The method of certification shall consist of both laboratories testing comparable sample bars for conformance to specifications. Primary considerations are a comparison of the results obtained by both laboratories, and a comparison of test data to specified product test limits. Test data from the laboratories shall compare within the limits specified.

3.1.1 Acceptance Under Certified Manufacturer Status. Under certified manufacturers status, reinforcing bars and dowel bars will be accepted on the basis of certified test data as shown on the certified mill analysis. All reinforcing bar and dowel bar materials shipped to Department contracts

shall be accompanied by certified mill analysis, as indicated in 2.1 for each heat in the shipment. Reliability of data will be verified periodically by comparison tests of random samples from the jobsites.

3.2 Plant Sampling Procedure. The manufacturer shall be responsible for all plant sampling.

3.2.1 Sampling Frequency. Samples shall be taken from three different bars from three different heats. Each sample shall be from a different bar size when available. Thus, a total of nine samples will be taken.

3.2.2 Sample Size. Each sample of reinforcing bar shall be tagged on both ends with the same identification number. Each identification number shall be unique. Samples shall be 12 feet (4 m) long. Two specimens shall be made by cutting each sample bar into two equal lengths. Therefore, the specimen submitted to the Department shall be 6 feet (2 m) long.

3.2.3 Sample Testing. One specimen from each sample shall be tested by the manufacturer and the test results entered on the provided form (Attachment 1). This form shall be submitted to the Department laboratory. The specimen which is to be sent to the Department shall contain all the markings normally used by the manufacturer.

3.2.4 Chemical Analysis. The chemical analysis for each heat represented by the test specimens shall be sent to the Department laboratory.

3.3 Manufacturer Responsibility. The specimens shall be cut and identified by the manufacturer. Manufacturer plant facilities, witnessing of testing, and test records shall be accessible to the Department’s representative during normal working hours. The manufacturer through its suppliers shall be responsible for supplying material identification, certified mill analysis for all heats involved, and invoices required by the Engineer to make identification and for contract records. The manufacturer's laboratory tensile test equipment shall be maintained in good working order and calibrated annually by a qualified testing agency with a testing device traceable to NIST. A diary of all calibrations shall be maintained and shall be furnished upon request.

3.4 Department Responsibility. The Department will test the companion specimens and determine if a certified manufacturer status will be granted. The manufacturer will be notified in writing as to test results and manufacturer classification. The

certified manufacturer list will be maintained by the Department.

3.5 Engineer Responsibility. The Engineer will make positive comparison between the bar identification marks, the Type B Certification provided by the reinforcing bar fabricator or the manufacturer, and the invoice. Material from a certified manufacturer will be accepted based on the aforementioned.

4.0 REQUIREMENTS FOR MANUFACTURER CERTIFICATION.

4.1 Specifications and Tests. The specification requirements and test methods shall be in accordance with the Department's Standard Specifications for qualification into the certification program.

4.2 Laboratory Comparison Requirements. The test results for comparable sample specimens run at the manufacturer's and Department's laboratories shall not vary by more than defined limits. The difference between laboratories' results for unit weight, yield and tensile tests will be divided by the Department's results and shall not vary by more than the following:

Unit Weight. . . . . 1 percent
Yield. . . . . 10 percent
Tensile. . . . . 10 percent

The difference between laboratories' results for elongation and deformation height shall not vary by more than the following:

Elongation . . . . . 4 percentage points
Deformation Height . 0.2 mm

If 90 percent or more of comparable test values are within these limits, the manufacturer's laboratory will pass the laboratory comparison requirements.

4.3 Quality Requirements. The manufacturer will be allowed a maximum of one average test result per heat for tests identified in 4.2 to be less than the Department's Standard Specification minimums as tested at either laboratory.

No test specimen shall fail the bend test.

4.4 Certification Determination. A manufacturer in compliance with 4.2, 4.3 and chemical analysis requirements will receive certified manufacturer status. A manufacturer not in compliance with either 4.2, 4.3 or the chemical analysis requirements will be placed

in non-certified status. The manufacturer may submit a new sample with documentation indicating the quality improvements made to the manufacturing process to improve the quality of the product.

5.0 CERTIFICATION PROCEDURE FOR COATERS.

5.1 General. Certification shall be based on satisfactory compliance of epoxy coated reinforcing bars and dowel bars with specification requirements, comparison of test results between laboratories (level II coater), and satisfactory compliance to stated conditions for random samples taken from materials arriving at the jobsite. The major consideration is the comparison of test data to specified product test limits. Certified coaters (both level I and level II) shall use reinforcing bars and dowel bars from a manufacturer on the certified manufacturers list. The certified coater (both level I and level II) shall be in the certified coater's program at the time it supplies the coated reinforcing bars and dowel bars.

5.1.1 Acceptance Under Certified, Level I Coater. Under certified level I coater status, coated reinforcing bars and coated dowel bars will be accepted based on the coater's acceptance number issued by the Department. The coater shall be previously certified by the CRSI and in good standing at the time of acceptance. Proof of CRSI certification shall be provided to the Engineer.

In addition, all coated reinforcing bars and coated dowel bars shipped to Department contracts shall be accompanied by a type A certification from the coater covering the coating thickness and the adhesion test, and by a Type B certification for reinforcing and dowel bars provided by the reinforcing and dowel bar fabricators or manufacturers, for each shipment. A type C certification from the coater in accordance with 916 of the Department’s Standard Specifications shall be furnished identifying the coating material used and stating that it is from the Listing of Epoxy Coating for Steel. Reliability of the data will be verified periodically by comparison tests and random samples from the jobsites.

5.1.2 Acceptance Under Certified, Level II Coater. Under certified level II coater status, coated reinforcing bars and coated dowel bars will be accepted based on a coater's type A certification. The coater shall be previously certified by the Department based on comparison of test results between the coater's laboratory and the Department's laboratory. The coater shall select 10 coated reinforcing bar samples which are 4 m long. Each sample shall be tagged on both ends with

the same identification number. Each identification number shall be unique. Two specimens shall be made by cutting the sample bar into two equal lengths. One specimen from each sample shall be tested by the manufacturer and the test results entered on the provided form (Attachment 2). This form shall be submitted to the Department's laboratory along with 10 specimens that are 6 feet (2 m) long for testing. At least nine of the 10 specimens shall agree with the Department's test results as followings:

Epoxy Coating Thickness..... ± 25 µm
Epoxy Adhesion Test..... P/F

In addition, all coated reinforcing bars and coated dowel bars shipped to Department contracts shall be accompanied by a type A certification from the coater covering the coating thickness and adhesion test, and by the Type B certification for reinforcing and dowel bars provided by the reinforcing and dowel bar fabricators or manufacturers, for each shipment. A type C certification in accordance with 916 of the Department’s Standard Specification shall be furnished identifying the coating material used and stating that it is from the Listing of Epoxy Coated for Steel. Reliability of the data will be verified periodically by comparison tests and random samples from the jobsites.

5.2 Coater Responsibility. The coater’s plant facilities, witnessing of testing, and test records shall be accessible to the Department’s representative during normal working hours. The coater shall provide all the documentation required for the reinforcing steel bars and dowel bars. The coater shall provide the aforementioned coater documentation for each shipment. Certified level I coaters shall maintain all testing records for at least three years. The certified level II coater's laboratory test equipment shall be maintained in good working order. A weekly diary of all in-house calibrations shall be maintained and shall be furnished upon request.

5.3 Department Responsibility. The Department will test the companion specimens and determine if the certified level II status will be granted. The coater will be notified in writing as to test results and coater classification. The certified coater list will be maintained by the Department. A coater not in compliance with 5.1.2 will be placed in non-certified status. The coater may submit new sample with documentation indicating the quality improvements made to the manufacturing process to improve the quality of the product.

5.4 Engineer Responsibility. The Engineer will review all certification information and test results to assure that it complies with contract specifications.

5.5 Tests and Specifications. The methods of tests and specification requirements shall be in accordance with the applicable contract documents.

6.0 REQUIREMENTS TO MAINTAIN CERTIFICATION STATUS.

6.1 Engineer Responsibility. During each year, random samples from material supplied by each certified manufacturer and each certified coater will be taken at various jobsites. The samples will include as many grades and sizes as are available at the time of sampling. The samples will be submitted to the Department's laboratory for testing.

6.2 Department Responsibility. The Department will be responsible for all testing and evaluation of the samples. Written notice of manufacturer or coater classification changes will be sent to both the manufacturer or coater and all Districts. Based on the results of the random sampling and test results of the previous months, the manufacturer or coater will be notified in writing by the Department as to its status.

6.3 Manufacturer or Coater Responsibility. Each manufacturer or coater shall annually request to remain in the certification classification during the month of November of each year.

7.0 EVALUATION OF RANDOM SAMPLES.

7.1 Quality Requirements. A certified manufacturer or certified coater may be placed in the non-certified status when the test results from random samples vary more than the applicable specification limits by the following frequency:

(a) No more than 10% of the random test samples may fail the applicable specification limits;
(b) No more than 2% of the random test samples may fail the reinforcing bar bend test.
(c) No more than 5% of the random test samples may fail the epoxy adhesion test.

7.2 Failure to meet the requirements of 7.1 will place the manufacturer or coater in a non-certified status.

8.0 GAINING CERTIFICATION AFTER BEING ON NON-CERTIFIED STATUS. A new manufacturer or coater may apply for certified status at any time. The manufacturer or coater shall provide the Department documentation in accordance with 3.0 or 5.0. A manufacturer or coater who has been designated as non-certified may re-apply for certified status provided they can demonstrate proof to the Department that the causes of the designation as non-certified have been remedied.

ATTACHMENT I

INDIANA DEPARTMENT OF TRANSPORTATION
MATERIALS AND TESTS DIVISION
REINFORCING BAR MANUFACTURER CERTIFICATION FORM

Manufacturer Name _____ Location _____

Heat No. _____ Type _____ Grade _____ Date _____

	PRODUCER TEST RESULTS			
Ident. No.				Average
Designation No.				
Sample Mass, g				
Sample Length, mm				
Actual Mass, kg/m				
Yield Load, N				
Yield Strength, MPa				
Max. Load, N				
Tensile Strength, MPa				
Elongation in 203.2 mm, %				
Bend Test P/F				
Deformation Height, mm				

_____
Manufacturer's Signature

_____
_____
Testing Facility Signature Name of Testing Facility

ATTACHMENT II

INDIANA DEPARTMENT OF TRANSPORTATION
MATERIALS AND TESTS DIVISION
REINFORCING BAR COATER CERTIFICATION FORM

Coater Name _____ Location _____

Heat No. _____ Type _____ Grade _____ Date _____

*Coating Manufacturer _____ Coating Product Name _____

	PRODUCER TEST RESULTS			
Ident. No.				Average
Designation No.				
Coating Thickness, µm				
Epoxy Bend Test P/F				

_____
Coater's Signature

_____
_____
Testing Facility Signature Name of Testing Facility

* Shall be on Department's Listing of Epoxy Coating for Steel